

Process Analysis LDO Optical Oxygen Probe Paper Industry Maintenance reduced by 80 %



Fig. 1: Oxidation ditch with central final settlement tank



Fig. 2: LDO oxygen sensor in use

LDO offers 80 % less maintenance within paper industry

For many years there has been a strong end towards resource conserving production in order to cut water consumption in the paper industry. Nevertheless, in 2004 an average of 9.6 litres of wastewater was generated per kilogram of paper in Germany. Several paper mills, which together account for more than 75 % of the gross production volume, use biological processes to treat their wastewater.

In Neuss, Germany, Procter & Gamble (TEMPO paper handkerchiefs, etc.) has Europe's biggest factory for paper-based hygiene products. Its biological wastewater treatment plant became operational in 1994. The → reliable aeration control system uses the HACH LANGE LDO optical → oxygen sensor. This → H₂S resistant sensor enabled the monthly maintenance time to be reduced by 80 %.

The biological wastewater treatment plant at Procter & Gamble

"Water and auxiliaries", was the short but comprehensive answer to the question about the inflow stream to the biological treatment plant, which has been in operation at Procter & Gamble in Neuss since 1994. The volume of wastewater has been considerably reduced in the last four years, as prevention is far more cost-efficient than disposal.

The factory's water is supplied by its own wells, while the wastewater is disposed of directly into the Rhine (450m away) after passing through the factory's own wastewater treatment

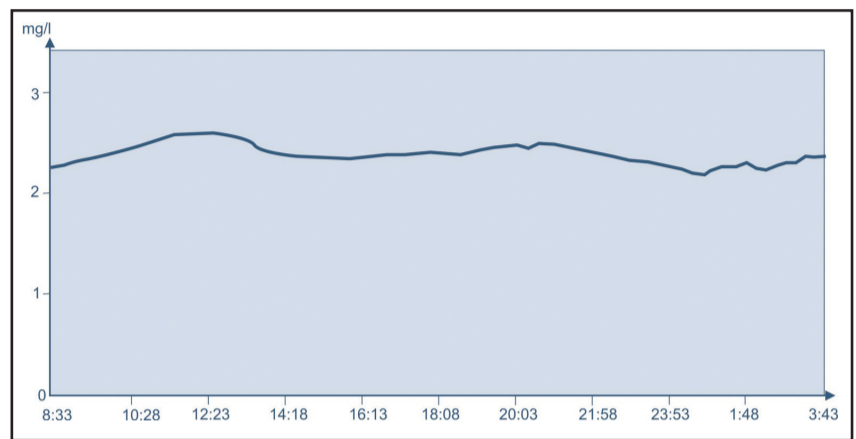


Fig. 3: Typical time course curve for dissolved oxygen

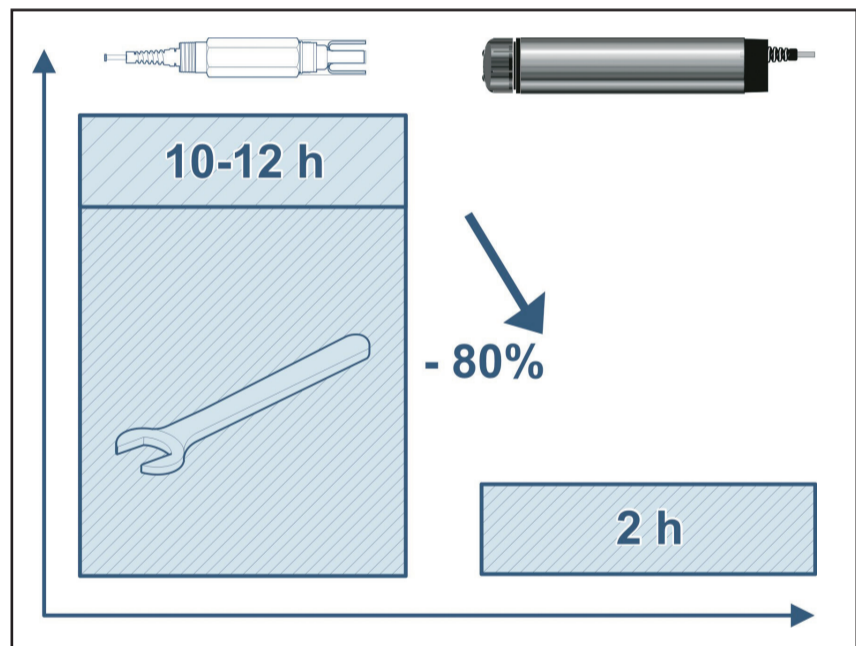


Fig. 4: Maintenance time per month with conventional oxygen sensor (left) and LDO (right)

plant (settlement tank with surrounding oxidation ditch) and an outflow. Direct dischargers have to fulfill considerable responsibilities, and can be inspected without prior notice at any time by the State Environmental Office (StUA). Such inspections hold no fears, as screens and polymer based flocculants ensure initial degradation at the primary settlement stage. In the coagulator, a 380 m³ stilling basin, the flocculated material and paper fibres are removed from the wastewater stream after sedimentation.

Aeration control using LDO

For two and a half years an LDO sensor has monitored the oxygen concentration in the downstream oxidation ditch and regulated it with the help of rotor aerators.

The target value is between 1 and 4 mg/l – depending on the wastewater that is to be treated, whose composition is subject to productrelated fluctuations.

Over 80 % less maintenance time through LDO

The decision in favour of this optical oxygen meter was not particularly difficult, as the maintenance requirement and lifetime of the previously used membrane based electrode no longer measured up to the needs of today. Thanks to LDO, the former 10 to 12 hours per month for cleaning and calibration were cut to two hours for cleaning and inspections (Fig. 4). The LDO does not have to be calibrated. A direct comparison between membrane technology and the optical method of measuring oxygen in this plant showed a cut of more than 80 % in maintenance time. Another negative aspect of the previous electrodes was the fact that H₂S related deposits caused frequent tears in the membranes.

The optical method makes no use of membranes and is therefore not affected by this problem.



At the end there is a clear result

A direct comparison between the inflow and outflow streams of the treatment plant and between the turbid influent mixture of water, paper fibres and auxiliaries and the fully transparent outflow stream yields a clear result (Fig. 5). The concentrations of the "dissolved" parameters in the outflow stream also confirm the corresponding quality of the discharged water. This expensive type of treatment requires a reliable aeration control system based on low maintenance and above all H₂S resistant oxygen sensors.



Fig. 5: Oxidation ditch with central final settlement tank

Summary

The biological treatment of wastewater from the paper industry makes extremely high demands on the oxygen measurement technology. Low-maintenance probes which are resistant to chemical interferences, and especially to H₂S are required. The LDO oxygen probe has proved its suitability under these trying conditions, over a period of more than two and a half years at Procter & Gamble. Instrument downtime, intensive maintenance and calibration times are a thing of the past.

AUTHOR DETAILS

Author: Dirk Ritterbach
Head of Utilities Dept. Procter & Gamble Manufacturing GmbH, Neuss, Deutschland

Keep Your Turbidity Sensors Clean and Free From Biofouling



Zebra-Tech Ltd (New Zealand) has launched the Hydro-Wiper. The Hydro-Wiper is a mechanical wiper system that fits onto turbidity sensors to keep them clean and free of biofouling. The Hydro-Wiper is currently available in 3 models that fit the D&A OBS 3, the OBS 3+, and the Seapoint Turbidity Sensor. The data from these instruments can deteriorate in quality if the optical window becomes fouled by silt, mud and other deposits, algae and other bio-growth. The regular brushing action of the Hydro-Wiper reduces the need for costly site visits to clean the instruments, and enables long term deployments to be successfully made, even in extremely harsh conditions. The Hydro-Wiper is very robust and rugged, suitable for both marine and freshwater environments. It features a choice of 10 user selectable wipe interval settings, with timing controlled by a high precision embedded clock (+/- 1 minute per year).

— Reader Reply Card no — 52

Water Flow Measurement in a Dam Outlet



At the base of a dam, the outlet pipes are used for hydroelectric power production and drinking water supply. A flow measurement was needed about 100 meters below the dam crest, on a 72" pipe.

Magnetic inductive flowmeters (MID) are routinely used in the field of drinking water supply. However, these instruments are extremely expensive for large nominal widths. In this case, it would also have been extremely challenging to install a

72" MID deep inside the dam.

Flexim's (Germany) ultrasonic flow measurement system FLUXUS[®] ADM was easily carried by hand to the measuring site: no extensive earthworks were needed for installation, an elevator ride down to the pipe was enough to set up the measuring site. Thanks to the non-invasive installation by means of the handy clamp-on technology, it was not even necessary to stop operations for the setup. FLUXUS[®] now delivers dependable and precise flow data.

FLEXIM'S FLUXUS[®] ADM series is one of the most flexible solutions for flow measurement available on the market. The FLUXUS[®] flowmeters can be installed rapidly on pipes of almost any material, without pipe work and without interruption of the process. Transducers are available for pipe diameters ranging from 6 mm to 650 mm (0.24 in to 256 in).

Reader Reply Card no — 51

Reagent Free residual chlorine monitors

WITH PAYBACK IN UNDER 6 MONTHS



Free chlorine,
combined chlorine,
chlorine dioxide

No reagents and no moving parts



Tel: +44 145 783 2800
sales@atiuk.com

- Reduce running costs
- Complete for under £2000
- Includes 3 years spares
- Dual outputs for pH and Cl₂
- Maintenance interval 6-18 months

www.analyticaltechnology.com

Reader Reply Card no 53



AMI CODES -

Colorimetric Process Analyzer for Chlorine and other Disinfectants.



SWAN sets the standard

- Colorimetric measurement according to standard methods (ISO, ASTM).
- Automatic zero calibration before every reading.
- Sample flow and reagent level monitoring.
- Programmable functions for dosing and P, PI, PID or PD control parameters.
- Optional pH-measurement.
- Standard version for free chlorine, monochloramine, chlorine-dioxide and ozone.
- TC version for total chlorine.
- Add-on module for automated chemical cleaning of flow-through cell and photometer.

Ask for technical documentation or check our homepage. www.swan.ch

SWAN ANALYTISCHE INSTRUMENTE AG · CH-8616 RIEDIKON
www.swan.ch · swan@swan.ch · Tel. ++41 44 943 63 00

Reader Reply Card no 54